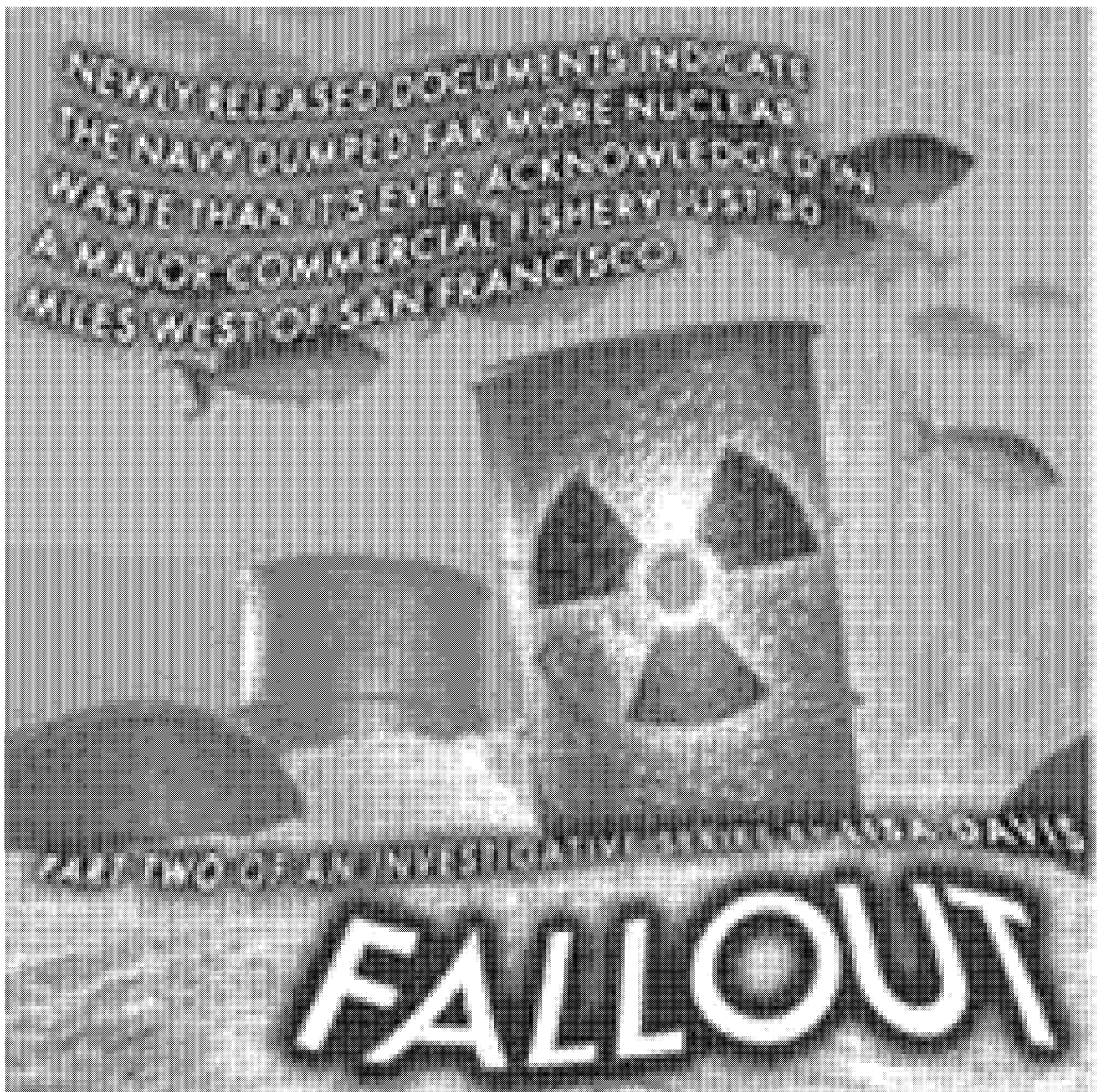


## FEATURE

### Fallout

Newly released documents indicate the Navy dumped far more nuclear waste than it's ever acknowledged in a major commercial fishery just 30 miles west...

Lisa Davis • 05/09/2001 4:00 am



John Gessleman spent his post-adolescent years as a gunner's mate in the United States Navy. Between 1955 and 1959, he was stationed on the *USS Cahokia*, a tug that shipped out of San Francisco Naval Shipyard at Hunters Point. Part of his regular job was to escort a barge carrying radioactive waste under the Golden Gate Bridge and out into the Gulf of the Farallones. There, the bottom of the barge would open to release containers of radioactive waste into the sea.

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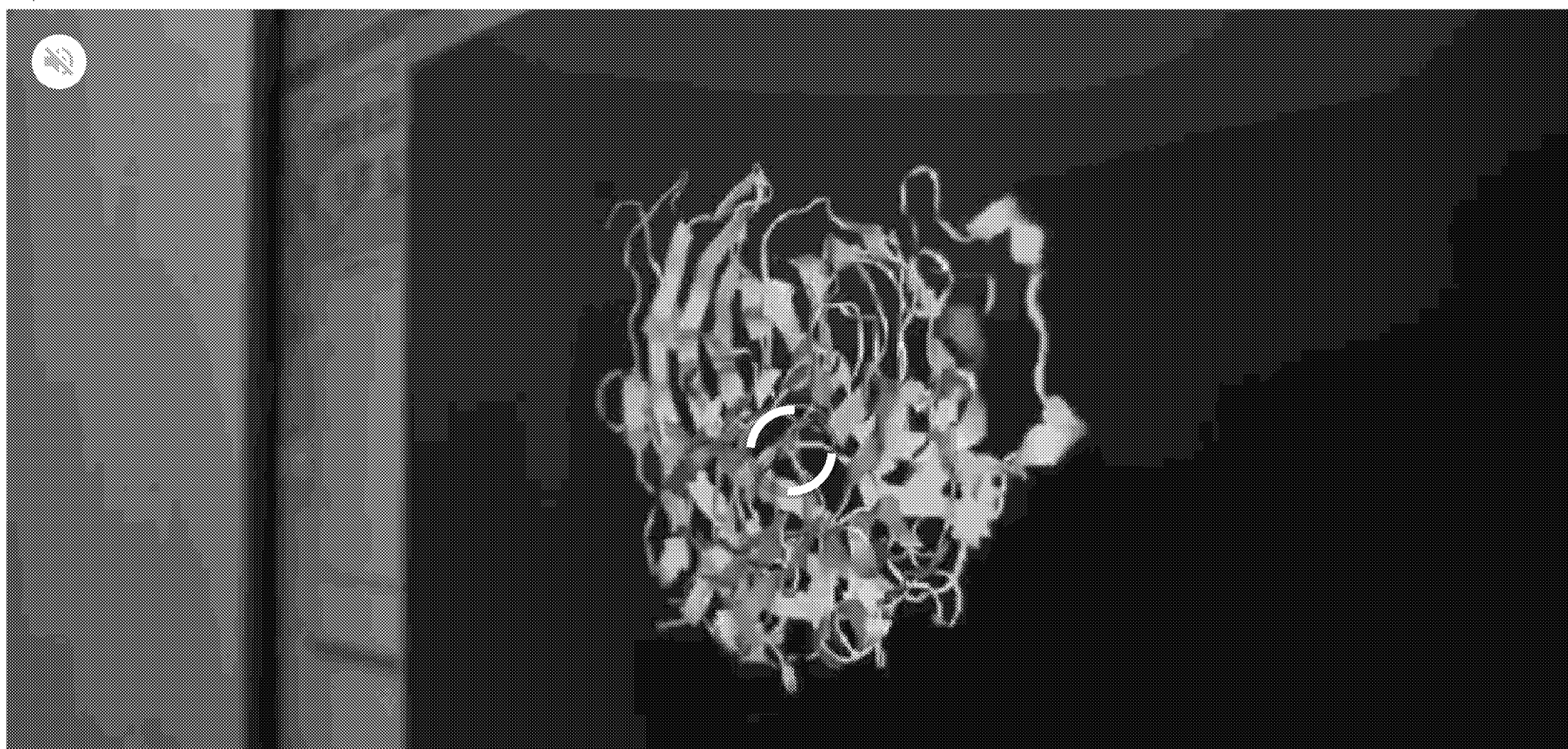
Now, Gessleman lives in Pennsylvania; his speech is slurred, and his wife, Ann, often has to translate what he's saying on the phone. In 1980, Gessleman was diagnosed with a form of multiple sclerosis, which has left him in a wheelchair, with limited use of his left arm and sight in only one eye. John Gessleman believes his time in the Navy, working near radioactive waste, contributed to his present condition. He remembers, for example, sleeping on the starboard side of his ship — the side next to the barge's loading gate — but as with most claims by atomic veterans, the government disagreed, and refused to pay him for a service-related disability.

Gessleman says that the carcasses of dead animals constituted much of the cargo on the barge his tug regularly towed; those animals had been used in experiments at the Naval Radiological Defense Laboratory at Hunters Point, the military's leading laboratory for applied nuclear research, and at the University of California's Lawrence Laboratories. There were other kinds of waste inside 55-gallon drums that were loaded onto the barge, but Gessleman doesn't remember what that waste was; in fact, he's not sure, now, that he ever knew what was in the barrels.

The routine was always the same: Barrels were collected on the barge until it was full, and then it sailed out the Golden Gate and dropped its load into the sea. On a few occasions, Gessleman remembers, a representative from the Atomic Energy Commission came on board the ship and told the captain that measurements showed the radiation levels were too high, and the ship should be cleaned up before the next load.

Another part of Gessleman's job was to shoot holes in the barrels that didn't immediately sink, so that they would. He says he did his job — shooting about 10 to 20 barrels once or twice each week — which means that many of the Navy's radioactive waste containers were breached before they ever reached the bottom of the sea, and became part of what is known as the Farallon Islands Nuclear Waste Site.

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The Farallon waste site is a triangle-shaped piece of seascape that sits about 30 miles west of San Francisco. It encompasses most of the Gulf of the Farallones National Marine Sanctuary, a gorgeous refuge of marine and other wildlife that includes some of the most fertile commercial fishing waters in the Pacific. The islands themselves are home to one of the nation's largest populations of breeding seabirds, along with thousands of sea lions. The waters surrounding them are rich with fish and bottom-dwelling sea life. In fact, in recent decades, divers in the area have brought up at least 50 species of worms and crustaceans previously unknown to science.

Certainly, this seems a ridiculous place to situate the nation's first and largest sea dump of nuclear waste. In the mid-1940s, however, the Defense Department and, indeed, the federal government as a whole were much more concerned about keeping nuclear trash out of enemy hands than they were about the environment. The waters near the Farallones were seen as a convenient spot, far enough away to be out of sight, close enough to be under control.

Government officials have long acknowledged that the dump site contains some 47,500 barrels of low-level radiation waste generated by Navy and University of California nuclear laboratories. And yet, neither the Navy nor anyone else has ever been able to produce any kind of accounting or documentation that confirms the numbers of barrels dumped or describes the contents of the barrels. Government officials have speculated that the waste was trash, a mix of junk and laboratory accessories, some of which had been exposed to small amounts of radiation, none of which posed a threat to human health.

But such assertions grossly underestimate the extent of Cold War-era research in the Bay Area and the types of radioactive materials used in that research. Although official government statements continue to refer to the Farallon Islands Nuclear Waste Site as a “low-level” waste repository — that is, a place containing radioactive materials that have short “half-lives,” and that would therefore decay quickly and be diluted by sea water — there is good reason to believe that something far more dangerous is parked at the bottom of the ocean near the Farallones.

Once-classified military documents and former government employees strongly suggest that the Navy's “low-level” designation is incorrect, and that significant amounts of high-level, extremely long-lived radioactive materials are sitting on the ocean bottom near the Farallones. To wit:

- The Navy's own documents, declassified at the request of *SF Weekly*, show that significant amounts of the nuclear bomb component plutonium, which has a half-life of 24,000 years, and similarly long-lived “mixed fission” products were used at the nuclear laboratory at Hunters Point. The Navy has asserted that all nuclear materials used at the NRDL were subsequently disposed of at the Farallon waste site.

– An entire radioactive ship, the 10,000-ton aircraft carrier *USS Independence*, is believed to have been sunk in or near the waste site. The carrier itself was clearly “hot” when it went down. It had been used as an atomic bomb target and a nuclear laboratory, and it was packed full of fresh fission products and other radiological waste at the time it sank.

– Two government officials say the Navy told them thousands of barrels containing “special” wastes — that is, high-level, long-lived radioactive materials — were dumped in the Farallon site.  
[page]

In the decades since World War II ended, many scientific studies have shown that radioactive materials dumped at sea can enter the marine food chain through bottom-dwelling organisms, such as clams and mussels, and that radiation can accumulate in fish and other, higher-order animals that feed on the bottom-dwellers. It is also widely accepted that eating fish that have taken in significant amounts of radioactive material can be dangerous to humans, increasing the incidence of cancer and other radiation-linked diseases.

For as long as the public has known about the Farallon Islands Nuclear Waste Site, government officials and scientists alike — including those who don't agree on the potential hazard of the Farallon dump — have said that the area should be monitored. The U.S. Environmental Protection Agency's own contractors have said the site contains material that might be transported into the food chain, or even onto beaches or into San Francisco Bay.

Yet, more than 50 years after radioactive waste was dumped at the heart of a major fishery just off San Francisco, there has been no comprehensive study or regular monitoring of the site, the fish that swim there, or the fish that have been caught there and sold for human consumption.

Both the Navy and the U.S. Department of Energy have for years maintained a position that is internally inconsistent: They have repeatedly claimed that they do not know for certain what is in the Farallon Islands Nuclear Waste Site, and, simultaneously, they have repeatedly asserted that whatever was dumped in the Farallones is not dangerous. Not only does the position defy common sense, it ignores volumes of declassified government records detailing some of what was dumped in the Farallones. And the government has access to reams of documents that remain classified, and that would almost certainly describe radioactive materials used in government labs and dumped in the Farallones.

The simple truth is that no one can say with any degree of certainty whether the Farallon Islands Nuclear Waste Site and the fish taken there are safe, because no one has fully studied them. In fact, the U.S. government has gone out of its way to avoid learning or disclosing what it put on the sea floor 50 years ago.

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The Naval Radiological Defense Laboratory was created at Hunters Point Shipyard in 1946 to handle and experiment with ships that were contaminated in the world's fourth atomic bomb explosion, which was part of the Operation Crossroads nuclear tests conducted at Bikini Atoll in the South Pacific. From humble, hasty beginnings, when it decontaminated ships that had been underneath the infamous mushroom cloud in the Pacific, the NRDL grew steadily bigger, and its work more complex.

The NRDL existed from 1946 until 1969; the Navy kept its very existence a secret until about 1950. At the peak of operations, the lab employed some 600 people — mostly military and civilian scientists — who researched the effects of nuclear weapons and how to mitigate those effects. The

laboratory worked on projects for the Armed Forces Special Weapons Project and took part in

almost every nuclear weapons test the military performed. Along the way, scientists exposed thousands of mice, dogs, and larger animals to long-lived radiation, often in nuclear tests in the Pacific and Nevada.

Wellard Guffy was a supply officer at the NRDL from 1957 to 1960. Part of his job was to oversee the disposal of the laboratory's radioactive waste. In fact, his name was on the Atomic Energy Commission license allowing the laboratory to dump near the Farallones during that time. He remembers what was sent out to sea this way: "Look at the dictionary of radioactive substances; we had it all. Plutonium, tritium, extremely dangerous stuff," he says, adding that "a lot of it was much less dangerous than that."

Guffy's recollections aside, there is voluminous documentation strongly suggesting that high-level, long-lived radioactive waste has been dumped in the Farallones.

Historical records obtained by *SF Weekly* show that the NRDL regularly acquired and used, among other things, uranium, plutonium, thorium, cesium, and strontium — potentially deadly radioisotopes with half-lives from 30 to (in the case of thorium) several billion years. The lab also used mixed fission products (that is, highly radioactive substances akin to expended nuclear reactor fuel). Along with the radioactive waste the lab itself generated, the NRDL also handled nuclear disposal for other defense-related entities, including McClellan Air Force Base in Sacramento and the University of California, a leader in nuclear research. Government officials have asserted that all nuclear materials used at the NRDL were disposed of at the Farallon waste site. If this assertion is true, then the Farallones site must be home to a variety of long-lived, high-level radioactive poisons.

Then again, government officials have acknowledged that the site contains at least some long-lived nuclear material.

In a 1980 congressional hearing, David Hawkins, then-assistant administrator for the EPA, testified that the bulk of the nuclear waste in the Farallones consists of equipment, tools, lab clothing, and other materials contaminated with low-level, relatively short-lived radioactive substances. Still, he acknowledged that isotopes with the potential to adversely affect the environment for long time periods — including strontium and cesium — also had been dumped at the site.

"And, at times, they may have included small quantities of source materials such as uranium and thorium, or traces of special nuclear materials such as plutonium," Hawkins said, giving no indication of why he named those particular materials, and insisting that because there were no logs of what had been dumped, the government had no way to know for sure what is on the Farallones sea floor.

A decade later, another clue was dropped, this time during a meeting among representatives of state and federal agencies reviewing the Farallon site. At that meeting, according to two officials who were present, a U.S. Navy captain reported that the Navy was aware of having dumped some 9,000 containers of "special waste" into the Farallones area. [page]

“Special waste” is a term that U.S. defense agencies use for high-level, long-lived radioactive materials, including uranium and plutonium, the latter of which, because of its long half-life, would be as dangerously radioactive today as it was 56 years ago, at the end of World War II. (Plutonium-239, the fuel of nuclear weapons, can cause cancer if even a tiny fragment makes its way inside the body, and has a half-life of 24,000 years. That is, half of a given mass of plutonium will decay in 24,000 years, or, to put it conversely, half the amount present today will still remain in 24,000 years.)

At the next meeting of the interagency group, U.S. Geological Survey geologist Herman Karl remembers, the Navy captain recanted his earlier report, saying that the Navy was not aware of any special waste dumped in the area. The subject was never discussed again in group meetings, Karl says. Another official who attended the meetings, and who requested anonymity, backs Karl's account of the two meetings. A third government official remembers the captain being part of the group, but nothing else.

Attempts to contact the Navy captain were unsuccessful.

In a prepared statement, Lt. Steve Curry of the Navy's Office of Information in Washington, D.C., responded to questions about the Farallon waste site this way: “The barrels in question contain mostly laboratory wastes generated during research activities and/or decontamination procedures.” Curry said the EPA, in cooperation with the Navy, had investigated the site in 1975 and again in 1985. He went on to say, “A typical waste package observed during the 1985 investigation (after 30 years immersion) showed very little evidence of any effect of the deep sea environment other than a small area of mild implosion on the upper surface, and its concrete matrix showed very little spalling [chipping or flaking].”

Curry's statement fails to address the crucial distinction of whether these “laboratory wastes” are high-level, long-life radiation sources or lab equipment and materials that were slightly contaminated during NRDL research.

And the government's own research conclusively disproves Curry's suggestion that the waste containers in the Farallones remain largely intact. Studies by the EPA and other government-funded researchers, some of which have even been presented to Congress, clearly show that many of the 55-gallon barrels containing radioactive waste at the Farallon site have imploded, or are corroded and disintegrating.

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The *USS Independence* was definitely sunk somewhere in the Pacific Ocean after it left Hunters Point Shipyard for the last time in 1951. It was definitely filled with radioactive waste — some of it of the high-level variety — when it went down. Although the Navy will not confirm the ship's whereabouts, the *Independence* is widely believed to rest in or near the Farallon undersea nuclear dump.

The 10,000-ton aircraft carrier was among the Navy's largest vessels when it was built in 1942, and had seen a great deal of action in World War II. Originally a cruiser, the *Independence* was converted into an aircraft carrier after it was hit by a Japanese torpedo at Tarawa. “The Mighty I,” as the ship was nicknamed, participated in the October 1943 battle at Wake Island.

The ship's radioactive history began in 1946, when it was a target ship parked in the lagoon surrounded by Bikini Atoll during the United States' largest atom bomb test. The *Independence* was only 560 yards from the blast, so close that it caught fire, and its upper decks were mangled into a mess of misshapen metal.

Following the test, the highly contaminated *Independence* was one of 14 ships brought to the San Francisco Naval Shipyard at Hunters Point for experimental decontamination in exercises that gave birth to the Naval Radiological Defense Laboratory. After several months of trying to cleanse the giant vessel with everything from vegetables to detergent to kerosene, government scientists decided that sandblasting followed by a citric acid rinse was the way to get rid of radioactive contaminants.

Eventually, the NRDL brass determined that the *Independence* was so “dirty” it was beyond hope of being safe to sail again. At that point, parked in the bay at Hunters Point, the *Independence* became a guinea pig. The prevailing wisdom, as revealed in NRDL records, seemed to be that since the Navy was planning to sink the contaminated ship anyway, it was the perfect place for radiation experiments.

On one occasion, scientists sprayed mixed fission products across a portion of the ship. Eventually, the NRDL decided to turn some sections of the aircraft carrier into a radiation lab. The ship-as-lab is described in a November 1948 memo from the NRDL to the Army's chief of engineers:

*Engineering Applications Division is in process of converting some of the interior compartments of the ship into an improvised hot-laboratory where high levels of activity can be used on fairly large-scale practical samples as a means of testing “quick and dirty” methods of decontamination.*

*... The big advantage of such an improvised hot-laboratory is that spills or other accidental contamination do not matter, since if the whole laboratory becomes contaminated it can either be moved to a new compartment or gross decontamination methods can be used on the laboratory without the necessity of careful disposal.*

All the while, the ship was used for another purpose: Radioactive waste produced by both the NRDL and the University of California's nuclear laboratories was stowed on the *Independence* until shortly before its sinking in January 1951. Correspondence from the time indicates that the radioactive waste packed onto the ship went down with it. A Dec. 23, 1949, memo from C.J. Brown, assistant chief of the Navy's Bureau for Research and Medical Military Specialties, describes the situation this way:

*During the past year, Independence has been used as a test laboratory for radiological decontamination studies. Large quantities of fresh fission product mixtures were introduced on board during these studies and subsequently were drained into empty tanks aboard the ship for stowage. Other contaminated materials that have been used in connection with the research program of the Naval Radiological Defense Laboratory also have been put on board the Independence. [page]*

Brown went on to explain that if the Navy wanted to salvage the *Independence* for scrap, it would have to remove and dispose of the contaminants on board, a process that would exceed the ship's scrap value. So Navy officials decided to sink the ship in a weapons test.

The exact circumstances surrounding the *Independence*'s sinking have never been made public. At the time, Navy officials told reporters that the ship had been sunk in a weapons test some 200 miles off the coast. But the captain of a merchant ship claimed to have witnessed the *Independence* go down only 40 miles outside the Golden Gate, which would put it near the Farallon Islands Nuclear Waste Site. The Navy did not comment on the merchant captain's observations. But during a recent project aimed at mapping nuclear waste barrels dumped near the Farallones, government scientists found nothing where the Navy has said it sank the *Independence*, and a large shipwreck that fits the *Independence*'s description close to the nuclear waste site.

Navy officials still refuse to comment on the location of the *Independence*, citing policies, aimed at preventing salvage or looting, that prohibit confirming the exact location of any sunken Navy ship. Regardless of where it is, the *Independence*, which remains the property of the U.S. Navy, has apparently not been monitored in regard to radioactive contamination.

Depending on what, precisely, they turn out to be, the “mixed fission” products on the *USS Independence* could represent as much radiation as all the barrels in the Farallon dump site, according to W. Jackson Davis, head of the International Environmental Policy program at the Monterey Institute of International Studies and an international environmental consultant. (*SF Weekly* contracted with a team of analysts working under Davis' direction to review environmental documents pertaining to the Hunters Point Shipyard. Their findings were included in Part One of this series.)

“You'd sure like to know what “mixed fission” products mean,” Davis says. “Whether you could immediately tell by monitoring the surrounding area, I'm not sure. It could mean that the waste is still entombed within that ship.”

That the waste might be mostly contained by the *Independence* is not necessarily a positive notion. Shipwrecks attract the very creatures that tend to absorb radiation into the food chain of sea life. Invertebrates such as clams and mussels are particularly attracted to the hard surface area provided by sunken ships.

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The safety of nuclear waste dumped in the Gulf of the Farallones began to be questioned nearly as soon as dumping stopped in 1970. But the concern has been expressed publicly only in fits and spurts.

In 1974, the EPA conducted an investigation of the site but could locate only about 150 of the 47,500 containers the government has acknowledged dumping there. Most had imploded or were otherwise damaged. Three years later, government scientists retrieved one barrel, which showed only low levels of radiation. But a survey of the sediment surrounding containers at the sea bottom showed radiation 25 times higher than “background,” or what is normally attributed to the fallout from atmospheric testing. More disturbing were underwater photographs taken at the site that showed sable fish feeding within inches of a leaking barrel of radioactive waste.

The barrels captured the attention of then-U.S. Rep. Leo Ryan, a San Francisco Democrat, who held the first congressional hearing on the Farallon Islands Nuclear Waste Site in 1976. At the time, EPA officials told Congress that the situation was potentially dangerous and would require more study. Then the Farallones faded from the spotlight.

Four years later, a group of environmentalists enlisted the support of Quentin Kopp, then a San Francisco supervisor, who rallied supervisors from several Northern California counties and formed the Ad Hoc Coastal Counties Supervisors Committee on Nuclear Waste. The group, which included Barbara Boxer, a Marin supervisor at the time, immediately engaged in battle with federal agencies, including the EPA, over information the supervisors deemed “incomplete, conflicting, and inaccurate.”

Kopp introduced a resolution by the San Francisco Board of Supervisors calling for the release of EPA reports on the Farallon waste site. Robert Dyer, head of the EPA's Office of Radiation Programs, told reporters that he was a “one-man show” who had had neither the time nor the resources during the previous three years to complete reports on the Farallon waste site.

Later in 1980, another, more heated, congressional hearing was held in San Francisco. Included in the mix were then-Congressmen John Burton and Leon Panetta, and the stakes were higher than ever. At the time, the EPA and other government agencies were studying the possibility of resuming ocean dumping of nuclear waste. Needless to say, the long-term safety of the nation's largest sea dump was key to both sides of the debate.

Department of Energy officials told Congress that the Farallon ocean-floor dump contained only "low-level" waste, and that "natural dilution and dispersal" would result in safe levels of radiation in the environment.

The first assertion was untrue, and the second, unsubstantiated. Government officials had already owned up to having dumped "trace amounts" of elements, including plutonium, that were not considered "low-level." In fact, in the same hearing, the EPA's David Hawkins gave this vague statement on the matter: "[The containers in the Farallones] might have included highly radioactive materials, but not high-level wastes. It [sic] is a special definition for high-level waste." Hawkins was not asked for, and did not give, such a definition.

In the end, the congressmen verbally spanked various bureaucrats for the dearth of information on the situation at the bottom of the sea near San Francisco. Everyone seemed to agree that the matter should be studied more. It never really was. [page]

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One of the first men to take a serious look into the waste containers near the Farallones was the EPA radiation specialist, Robert Dyer. In 1974, Dyer and his crew surveyed the area, retrieved one of the barrels, and took it to Brookhaven National Laboratory in New York for a peek inside.

For safety reasons, Dyer purposely selected a barrel, located in the shallow part of the dump site, that seemed to be in particularly good condition. The barrel had no holes in it, was only minimally corroded, and wasn't leaking radioactive waste. Upon opening the drum, EPA scientists seemed somewhat puzzled to find cardboard, and concluded that the barrel likely contained trash that was either suspected of being contaminated, or was somehow accidentally tainted by short-lived radiation that had long since dissipated.

History would suggest a different explanation. NRDL records clearly spell out the lab's policy for handling radioactive waste. Among the regulations is the directive that liquid waste be placed in certain containers *lined with cardboard* until ultimate disposal. So, it's likely that the barrel came from the NRDL, and once contained radioactive liquid that either spilled or leaked out sometime prior to arriving at the Brookhaven Laboratory.

The barrel that apparently leaked its liquid radioactive contents into the ocean is hardly the worst of what's been seen at the Farallon dump site. The limited survey done by Dyer's team found the majority of containers at the dump to be imploded, corroded, and leaky.

In the late 1970s, two researchers from the University of Washington's College of Fisheries examined fish and sediment near the Farallon Islands in a study funded by the EPA. The pair found levels of plutonium and cesium in sediment near waste containers dumped by the Navy to be up to 20 times higher than what is expected because of fallout from above-ground nuclear weapons testing by the U.S., the former U.S.S.R., China, and other nuclear nations. Some of the organisms the researchers studied contained elevated levels of plutonium, although plutonium was not found in the edible, muscle parts of the fish. The finding suggested that plutonium was being picked up as the fish grazed in sediment for food, but was not being digested into the body of the fish, which is most of what humans eat.

In 1980, W. Jackson Davis, then an environmental scientist at UC Santa Cruz, found that data from the EPA's own reports on the Farallon waste site suggested a much greater potential for hazard than the government had previously admitted. Specifically, Davis found that plutonium levels in the samples collected by the EPA exceeded background levels by far more than had been reported. This prompted a war of interpretation between government and academic scientists that was never truly resolved.

A few years later, the state Department of Health Services hired UC Davis professors Thomas Suchanek and Manuel Lagunas-Solar to test fish around the waste dump site. Suchanek, a research ecologist and director of UC's Clear Lake Environmental Research Center, collected fish samples at various time periods between December 1986 and September 1987. Lagunas-Solar, a radiochemist at the UC Crocker Nuclear Laboratory, analyzed the results.

The researchers found plutonium, cesium, and americium — an isotope that emits about three times as much radioactivity as radium — in the fish. In particular, americium and one kind of plutonium were found at levels *higher than has been reported at any other site in the world*.

In their analysis, Suchanek and Lagunas-Solar also recalculated the results of samples taken earlier by Dyer and his EPA researchers and found certain radionuclides to be as high as 1,000 times what would be typically attributed to background levels from nuclear fallout, as opposed to the two-to-25-times-background conclusions reached by the EPA researchers.

After conducting their initial research, but before having published the results, Suchanek and Lagunas-Solar concluded that their findings warranted study of creatures lower in the food chain, and thus closer to the source of radiation. (Radioactivity multiplies as it moves up the food chain in such a way that creatures at the top of the chain — fish that feed on fish, for example — might contain 40 times more radioactivity than crustaceans or other prey on the bottom.)

Based on the findings of research he and Lagunas-Solar had conducted, Suchanek says he was approved for a \$260,000 grant from the National Oceanic and Atmospheric Agency to study radioactive isotopes in crustaceans living near the Farallones. But then Suchanek and Lagunas-Solar published their findings about radiation contaminants at the nuclear dump.

And some strange things happened.

Suchanek says he met with Dyer, the EPA radiation specialist, who warned him to “stay away from the nation's nuclear waste dumps.” Shortly after Dyer's visit, Suchanek says, he was notified by the NOAA that the agency's remotely operated vehicle — the unmanned submarine that was key to Suchanek's proposed research — would not be available, and, therefore, his research into the Farallon site would not be funded.

Dyer disputes Suchanek's account.

“I wasn't working on the West Coast in the 1980s, and I wouldn't have cared what was going on out there then,” Dyer says. “I was accused of almost everything. This was such a political thing. I finally decided, “It's California, I have to get used to that.””

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A decade ago, Herman Karl, a USGS geologist, and Ed Ueber, the NOAA's director of the Gulf of the Farallones National Marine Sanctuary, began what would become the most extensive look at the mysterious barrels of radiation on the seabed undertaken to date, even though it only covered about 15 percent of the waste site. They and their crew sailed into the choppy waters near the Farallon

Islands, set anchor, and carefully lowered a small, unmanned submarine — that is, a remotely operated vehicle — to the bottom of the sea. The idea was to definitively locate the containers of radioactive waste the Navy had dumped, and then determine what was leaking out of them. [page]

Karl and his colleagues at the USGS had already mapped what appeared to be nuclear waste containers using sidescan sonar, a special type of sonar that projects a beam of sound into the environment and uses the returning echoes to form a picture of the surrounding area. Now it was time to see if those scans had, indeed, identified waste barrels, rather than rocks or other naturally occurring sea-floor phenomena. This was an important step in any further research of the area. The containers were not where Navy logs from the time said the barrels had been dumped. (The difficulty in locating the barrels may have been due to changes in navigational equipment over the last 50 years.) Without a map of some kind — in this case, the sidescan sonar images — there would be limited hope of knowing even where to start studying the waste site.

The weather was terrible, and the seas unforgiving. The first few attempts were a bust. The project quickly ran through its \$1 million budget from the EPA and NOAA, leaving Karl and Ueber to beg, borrow, and steal from other projects to keep this one alive. “Herman and I were doing this on a handshake,” recalls Ueber. “It was what we could add on to our normal work ... to get this project done.”

At one point, Ueber went down in a manned submersible — borrowed from the Navy — and tooled around some barrels about 1,000 feet below. The sub's propeller got too close to the bottom and kicked up dirt, so Ueber had to wait for the dust storm to clear before heading back up. He says instruments on the sub measured radiation at three times higher than what is considered normal background levels in the atmosphere. That was the last time the researchers were able to use the sub, a particularly pricey piece of equipment that, were it contaminated or damaged, would cost more than \$100 million to replace.

By 1997, Karl was talking with his counterparts in the British government, who had developed equipment that could measure radiation as far as 3,000 feet undersea. The British scientists were anxious to get in on Karl's study, and agreed to bring their equipment to the Farallones. But it took another year before the USGS's ship, already committed to other projects, became available.

In the end, the joint team of researchers was able to confirm the mapping that Karl's group at the USGS had done with the sidescan sonar, which is to say that there were barrels where the researchers predicted they would be, and no containers where they had not. And the British scientists reported only low levels of radiation. But the team was only able to study 15 percent of the area before also running out of time and money.

Which means that approximately 85 percent of the nation's largest undersea nuclear waste dump has never been observed or tested.

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In the 1970s, a group of marine biologists working on Project Tektite, a public-private partnership created to study the behavior of sharks, spent a good deal of time diving near the Farallon Islands. The divers had no clue they were in the middle of an undersea nuclear waste dump. They saw a seabed littered with corroded 55-gallon drums and cement boxes, animal carcasses, and debris, but it wasn't until they saw a newspaper article about the site that they realized where they'd been. Shortly afterward, Dr. Harold Ross, who'd led the Tektite expedition, offered the government, through Congress, the use of his group's sophisticated diving and surveillance equipment to take a closer look at the area. His offer went unheeded.

For decades, scientists have said that the Farallon Islands Nuclear Waste Site ought to be monitored. As far back as 1960, the National Academy of Sciences took the official position that the site should be studied regularly. In two congressional hearings on the waste site, there was disagreement over the level of potential danger associated with the waste, but essentially everyone agreed that the site should be monitored to record the effects of radiation on the environment and fish.

At the 1980 hearing, then-Congressman Burton said, “There should be mandated as quickly as possible, through either committee language, appropriation, or authorizing language, a system of monitoring. ... We have to have a systematic, periodic monitoring of the fish and other aquaculture to find out what is happening.”

His colleagues were equally passionate that the area be watched.

Even the EPA, which had by this time released a study that generally found the site to be an unlikely hazard, said that the dump ought to be kept under periodic surveillance. Hawkins, the assistant EPA administrator, told the congressmen, “It will now be necessary to collect additional samples for further analysis, and that is something that the government intends to see get done.”

It did not.

In an exchange with EPA radiation specialist Robert Dyer, Burton asked how often the site should be monitored. Here is an excerpt of what followed:

*Dyer: “Six-month type of period.”*

*Burton: “Have you been doing that?”*

*Dyer: “No, we haven't.”*

*Burton: “Do you plan to do it?”*

At this point, Hawkins stepped into the fray, arguing that the agency had no resources for conducting a monitoring study of the Farallon site.

*Burton: “Do you plan to ask for the resources?”*

*Hawkins: “We plan to pursue with NOAA and anyone else that we can pursue it with to see if we can get these resources ...”*

*Burton: “... you have got a responsibility to come to the Congress and ask for more money to do this.”*  
[page]

No regular monitoring program followed.

In 1983, California legislators passed a law that funded investigation of the levels of radionuclides in some edible fishes from around the Farallon waste site. The state Department of Health Services subsequently contracted with the University of California — Suchanek's group — to monitor levels of radionuclides in bottom fishes and mussels in the area.

But the Legislature chose not to continue the law, and after 1987, there was no further monitoring.

On at least two occasions, federal agencies have hired contractors to look into potential hazards at the dump site. Both times the contractors have recommended that the area continue to be monitored. Neither time did government officials follow the advice of the contractors.

A May 1974 report done for the EPA by Interstate Electronics Corp. says:

*Because the shallower site may be one that could provide radioactive material that can be transported into the productive zone [i.e., the food chain] and possibly onto the beaches or into San Francisco Bay itself, a program to study the status of containers at this site should be initiated as a first priority.*

No such program was undertaken, other than Dyer's limited work for the EPA.

Nearly 20 years later, in 1993, the Hazardous Materials Response Branch of the NOAA hired another contractor, Tetra Tech Inc., to research "the present and future risks to resources in the vicinity of the Farallones."

Tetra Tech assumed in the study that risk was based on low-level waste, and concluded that any hazard to natural resources was "below the level of concern." The report also stated that plutonium and americium will reach maximum release rates 80 to 200 years after their disposal (that is, starting somewhere around 2030) and "are expected to persist in the environment for an extended period of time."

The contractor did not look at, or consider, any possible human health hazards in the scope of its investigation. Nonetheless, the report goes on to suggest that a monitoring program be put in place to evaluate future risk at the nuclear waste site: "Periodic sampling of commercial species from the vicinity of the FINWS or development of market place monitoring program may provide adequate warning of any human health risk."

Again, no such monitoring program was put in place.

Another contractor, Ecology and Environment Inc., reviewed the Farallon dump site in 1988 and found that it could qualify as a federal Superfund site, which would make it a priority for cleanup and federal funds. But EPA officials disagreed, and never sought a Superfund designation.

Now, the U.S. EPA has redefined history and is suggesting, incorrectly, that scientific study has found no elevated radiation levels at the Farallon site.

"We studied it years ago and found that there was nothing there above background radiation, nothing above what would be occurring naturally," says Lisa Fasano, spokeswoman for the EPA in San Francisco. "We haven't done anything and wouldn't do anything. There is no monitoring out there."

The Monterey Institute of International Studies' Davis and other academic scientists say that, at a minimum, the Farallon waste site should be regularly monitored. And, they say, such monitoring would be a relatively simple matter that involved the testing of blubber samples from sea lions and fish-eating birds that are high in the food chain and, therefore, accumulators of environmental toxins, including radiation.

Only a handful of people have ever seen the radioactive graveyard at the bottom of the Gulf of the Farallones National Marine Sanctuary. Fewer have studied it, and those who have tend to disagree on one another's findings. But they tend to disagree in a predictable way. That is to say: Academic scientists tend to believe the undersea nuclear dump poses a far greater potential danger than do

scientists tend to believe the undersea nuclear dump poses a far greater potential danger than do their government-commissioned (and -paid) counterparts.

Without further study, there is no way to know, precisely, how much of a danger the Farallon site poses. Clearly, though, the government's position on the site is riddled with inconsistencies and outright falsehood.

The number of barrels in the Farallon waste site — supposedly, 47,500 — comes from an estimate done in 1974 by an Atomic Energy Commission researcher named Arnold Joseph, who never intended it to be a definitive count. In his report, Joseph cautioned that the number was based only on the limited information that he could find at the time.

Nonetheless, as years passed, the number somehow became a “fact” cited over and over by federal officials. So did the supposed “low-level” nature of the waste.

And as these “facts” are repeated, the Navy and the Department of Energy cling to the inherently contradictory position that, while they don't know a great deal about what was dumped in the Farallon Islands Nuclear Waste Site, what's there is not dangerous.

Documents obtained by *SF Weekly* appear to bring the federal government's position on the Farallon waste site into significant doubt. Government reports on the contents of the site do not take into account the aircraft carrier *Independence*, which was apparently packed with huge amounts of radioactive materials before it was sunk, very probably in the Farallones. The NRDL's own records strongly suggest that far larger amounts of plutonium, uranium, and other long-lived radioactive substances were dumped in the Farallones than the government has acknowledged. And two government officials say the Navy has acknowledged dumping thousands of barrels of high-level, long-lived, “special” nuclear waste at the site.

There are hundreds of boxes of records on the activities of the NRDL sitting in the National Archives and Records Administration in San Bruno and the Department of Energy's records repository in Las Vegas. Government files also contain information on the University of California laboratories that did nuclear research and shipped their waste to the NRDL at Hunters Point, which then dumped it in the Farallones.

Apparently, those records haven't been reviewed to assess what radioactive poisons made it to the bottom of the sea. Without such a review, followed by additional research in the Farallones, and some regime of monitoring of the undersea dump site, no government agency or academic researcher can say, definitively, whether the nuclear waste resting off the coast of San Francisco does or does not pose a danger to humans. [page]

But this much is clear: The past — and the future — of the Hunters Point Shipyard, the Naval Radiological Defense Laboratory, and the Farallon Islands Nuclear Waste Site are utterly, inextricably linked. The long-lived radioactive materials that were used at the NRDL during the early days of the nation's nuclear research program have not gone away. They will pose a potential danger for thousands or tens of thousands of years. Whether they are at the bottom of the sea near the Farallon Islands, at a decommissioned shipyard that the city of San Francisco wants to remake as its newest neighborhood, or at some other location, these exceedingly long-lived poisons are still with us.



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